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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/621,000	07/21/2000	PAUL S. DRZAIC	INK-049CP-(2108/35)	4620

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EXAMINER

RAPP, CHAD

ART UNIT

PAPER NUMBER

2125

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/621,000

Applicant(s)

DRZAIC ET AL.

Examiner

Chad Rapp

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 8-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/21/00 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 and 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

1. Claims 1-22 are presented for examination.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-7, are drawn to manufacturing a dielectric layer using reactive species, classified in class 700, subclass 121.
 - II. Claims 8-10, are drawn to manufacturing a dielectric layer using radiation, classified in class 700, subclass 166.
 - III. Claim 11, is drawn to manufacturing a dielectric using a voltage to cause an electrochemical reaction to form a gate dielectric, classified in class 445, subclass 24.
 - III. Claims 12-22, are drawn to manufacturing a dielectric layer using solvents and protecting the organic layer, classified in class 430, subclass 20.

3. The inventions are distinct, each from the other because of the following reasons:
The three separate inventions claim groups I, II and III manufacture a dielectric three different ways. Also, the specification separates these differences as different embodiments along with separate figures for the various embodiments.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II nor group III, restriction for examination purposes as indicated is proper.

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4. During a telephone conversation with Dwayne Rue on February 9, 2004, a provisional election was made with traverse to prosecute the invention of using reactive species to make a dielectric layer, claims 1-7. Affirmation of this election must be made by applicant in replying to this Office action. Claims 8-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

6. Under the section titled "Related Applications", this section needs to be updated because application number 09/289,036 is now Patent number 6,518,949.

7. The abstract of the disclosure is objected to because it contains too many words (must <150 words). Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Dimitrakopoulos et al. in view of Suh et al. and further in view of Aronowitz et al.

Dimitrakopoulos et al. teaches the claimed invention(claim 1) substantially as claimed including a method of manufacturing a semiconductor device comprising :

a. Providing an organic semiconductor layer is taught as an organic semiconductor also called Pentacene(col. 1 lines 9-10, col. 3 line 17 and fig.1).

Dimitrakopoulos et al. teaches the above listed details of the independent claim 1, however, Dimitrakopoulos et al. does not teach: depositing a reactive species on a portion of the organic semiconductor layer and reacting the reactive species with the portion of the organic layer to form a dielectric layer.

Suh et al. teaches :

a. Depositing a reactive species on a portion of the organic semiconductor layer is taught as the insulating layer goes on top of semiconductor(organic) layer(col. 4 line 40 to col. 5 line 13 and fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made or used to modify the teachings of Dimitrakopoulos et al. with the teachings of Suh et al. because using an insulating layer allows the device to be built with an organic layer that allows a flexible substrate the allows substantial benefits. It allows the omission of an annealing step. Removing this process reduces the over all cost of production of the thin film transistor.

Aronowitz et al. teaches :

a. Reacting the reactive species with the portion of the organic layer to form a dielectric layer is taught as the gate oxide layer (insulating layer) is masked and exposed to oxidation(abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made or used to modify the teachings of Dimitrakopoulos et al. with the teachings of Aronowitz et al. because as semiconductor geometries get smaller, the gate dielectric have to become thinner. This makes the dielectrics more susceptible to failure. Aronowitz et al. increases the capability of making thin dielectrics through hardening.

As to claim 2, Aronowitz et al. teaches wherein reacting comprises one of oxidizing, reducing or isomerizing is taught as the gate oxide layer is exposed to oxidation(abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made or used to modify the teachings of Dimitrakopoulos et al. with the teachings of Aronowitz et al. because as semiconductor geometries get smaller, the gate dielectric have to become thinner. This makes the dielectrics more susceptible to failure. Aronowitz et al. increases the capability of making thin dielectrics through hardening.

As to claim 3, Dimitrakopoulos et al. wherein the dielectric layer is a gate dielectric layer is taught as the gate insulator(gate dielectric)(abstract and fig. 1).

As to claim 4, Dimitrakopoulos et al. teaches :

a1) providing a gate electrode is taught as the gate(see fig. 1);

a2)providing the reactive species on the gate electrode is taught as the BST insulator is put on the gate(see fig.1).

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As to claim 5, Dimitrakopoulos et al. wherein the reactive species comprises one of liquid, solid or suspension is taught as the deposition of the gate insulator is a chemical solution(liquid)(abstract).

As to claim 6, Dimitrakopoulos et al. wherein the dielectric layer comprises an insulating layer of a thin film transistor is taught as a passivation layer can over coat and protect the device(thin film transistor) structure(abstract).

As to claim 7, Dimitrakopoulos et al. wherein the semiconductor device is part of a circuit for addressing an electronic display is taught as the thin film transistor structure can be used in flat panel display applications(abstract).

Conclusion

10. Note: the effective filing date used rejection is July 21,2000, because claims 1-7 did not have support in patent No. 6,518,949(application No. 09/289,036).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chad Rapp whose telephone number is (703)306-4528. The examiner can normally be reached on Mon-Fri 11:00-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on (703)308-0538. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cjr

A handwritten signature in black ink, appearing to read 'L. P. P.' followed by a large, stylized loop.

Chad Rapp
Examiner
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LEO PICARD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100